

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

DEC 18 2001 (PCT Rule 44.1)

To:
TOWNSEND AND TOWNSEND AND CREW LLP
Attn: Kezer, William B.
Two Embarcadero Center, 8th Floor
San Francisco, CA 94111-3834
UNITED STATES OF AMERICA

TOWNSEND AND CREW LLP

Date of mailing
(day/month/year) 03/12/2001

Applicant's or agent's file reference
17682A-362PC

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.
PCT/US 01/06900 ✓

International filing date
(day/month/year) 01/03/2001 ✓

Applicant

EPOCH BIOSCIENCECS, INC. ✓

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.
Filing of amendments and statement under Article 19: 2/3/02

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Further action(s): The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority
European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer
Maurizio Amodeo

Amendment 2/3/02

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments and any accompanying statement, under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the time of filing the amendments (and any statement) with the International Bureau, also file with the International Preliminary Examining Authority a copy of such amendments (and of any statement) and, where required, a translation of such amendments for the procedure before that Authority (see Rules 55.3(a) and 62.2, first sentence). For further information, see the Notes to the demand form (PCT/IPEA/401).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 17682A-362PC	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 01/ 06900	International filing date (day/month/year) 01/03/2001	(Earliest) Priority Date (day/month/year) 01/03/2000
Applicant EPOCH BIOSCIENECS, INC.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 7 sheets.
☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☒ furnished subsequently to this Authority in written form.
- ☒ furnished subsequently to this Authority in computer readable form.
- ☒ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☒ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (see Box II).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

- ☐ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☒ because this figure better characterizes the invention.
- 1a
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/06900

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

1-26 (in full), 44-62 (in full), 74-109 (in part)

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/SA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-13 (in full), 44-62 (in part), 74-109 (in part)

Oligonucleotides with at least two bases selected from the group consisting of unsubstituted and 3-substituted pyrazolo'3,4-d!pyrimidine bases, arrays, compositions and methods pertaining thereto. Furthermore, compounds of claims 44-62 inasfar as they contain a 3-substituted pyrazolo'3,4-d!pyrimidine base.

2. Claims: 14-26 (in full), 44-62 (in part), 74-109 (in part)

Oligonucleotides with at least one base selected from the group consisting of unsubstituted and 3-substituted pyrazolo'3,4-d!pyrimidine bases and at least one 5-substituted pyrimidine base, arrays, compositions and methods pertaining thereto. Furthermore, compounds of claims 44-62 inasfar as they contain a 5-substituted pyrimidine base.

3. Claims: 27-43 (in part), 63-109 (in part)

An oligonucleotide as in claim 27 or in claim 63 with at least one 5-substituted pyrimidine base, arrays, compositions and methods pertaining thereto.

4. Claims: 27-43 (in part), 63-109 (in part)

An oligonucleotide as in claim 27 or in claim 63 with at least one base selected from the group consisting of unsubstituted and 3-substituted pyrazolo'3,4-d!pyrimidine bases, arrays, compositions and methods pertaining thereto.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/06900

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07H19/06 C07H19/10 C07H19/16 C07H19/20 C07H21/00
C12Q1/68 A61K31/7115

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07H C12Q A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 51775 A (EPOCH PHARMACEUTICALS INC) 14 October 1999 (1999-10-14) abstract the whole document	1-10, 12, 13, 74-109
X	WO 98 49180 A (EPOCH PHARMACEUTICALS INC) 5 November 1998 (1998-11-05) the whole document	1-10, 12, 13, 74-109
A	WO 99 51621 A (EPOCH PHARMACEUTICALS INC) 14 October 1999 (1999-10-14) abstract scheme 4	1, 83

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

15 November 2001

Date of mailing of the international search report

03. 12. 2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

de Nooy, A

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	F. SEELA, G. BECHER: "Oligonucleotides containing pyrazolo'3,4-d!pyrimidines: The influence of 7-substituted 8-aza-7-deaza-2'-deoxyguanosines on the duplex structure and stability" HELVETICA CHIMICA ACTA, vol. 82, 1999, pages 1640-1655, XP002176753 the whole document structure 4d ---	1,7,12, 13,44,46
X	WO 90 03370 A (MICROPROBE CORP) 5 April 1990 (1990-04-05) abstract the whole document ---	1-10,12, 13, 74-109
X	SEELA F AND ZULAUF M: "Synthesis of oligonucleotides containing pyrazolo'3,4-d!-pyrimidines: the influence of 7-substituted 8-aza-7-deazaadenines on the duplex structure and stability" JOURNAL OF THE CHEMICAL SOCIETY, PERKIN TRANSACTIONS 1, CHEMICAL SOCIETY. LETCWORTH, GB, no. 4, 9 February 1999 (1999-02-09), pages 479-488, XP002161220 ISSN: 1472-7781 the whole document ---	1,7,12, 13
X	SEELA F ET AL: "8-Aza-7-deazapurine DNA: Synthesis and duplex stability of oligonucleotides containing 7-substituted bases" NUCLEOSIDES & NUCLEOTIDES, MARCEL DEKKER, INC, US, vol. 18, 1999, pages 1399-1400, XP002157790 ISSN: 0732-8311 the whole document ---	1,7,12, 13
X	SEELA F ET AL: "Duplex stability of oligonucleotides containing 7-substituted 7-deaza- and 8-aza-7-deazapurine nucleosides" NUCLEOSIDES & NUCLEOTIDES, MARCEL DEKKER, INC, US, vol. 16, no. 7-9, 1997, pages 963-966, XP002157792 ISSN: 0732-8311 the whole document --- -/--	1,7,12, 13

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/06900

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SEELA F ET AL: "131. 8-Aza-7-deaza-2'-deoxyguanosine: Phosphoramidite Synthesis and Properties of Octanucleotides" HELVETICA CHIMICA ACTA, VERLAG HELVETICA CHIMICA ACTA. BASEL, CH, vol. 71, 1988, pages 1191-1198, XP002078862 ISSN: 0018-019X the whole document ---	1,7,12, 13
X	SEELA F F ET AL: "The influence of modified purine bases on the stability of parallel DNA" BIOORGANIC & MEDICINAL CHEMISTRY LETTERS, OXFORD, GB, vol. 10, no. 3, February 2000 (2000-02), pages 289-292, XP004188837 ISSN: 0960-894X the whole document ---	1,7,12, 13
A	WO 00 06771 A (AFFYMETRIX INC ;MCGALL GLENN H (US); BARONE ANTHONY D (US)) 10 February 2000 (2000-02-10) claims ---	44,83
A	US 5 849 482 A (TABONE JOHN C ET AL) 15 December 1998 (1998-12-15) abstract, formula 1, claims ---	1,44
A	SEELA M AND ZULAUF M: "Synthesis of 7-alkynylated 8-aza-7-deaza-2'-deoxyadenosines via the Pd-catalysed cross-coupling reaction" JOURNAL OF THE CHEMICAL SOCIETY, PERKIN TRANSACTIONS 1, CHEMICAL SOCIETY. LETCWORTH, GB, no. 19, 1998, pages 3233-3239, XP002161221 ISSN: 1472-7781 page 3234 ---	44
A	WO 97 46313 A (ARRAY TECHNOLOGIES) 11 December 1997 (1997-12-11) abstract claims ---	74 ---
X	D. GRAHAM ET AL.: "DNA duplexes stabilized by modified monomer residues: synthesis and stability" J. CHEM. SOC., PERKIN TRANS. 1, 1998, pages 1131-1138, XP002183068 the whole document ---	44,48, 61,62
A	---	14
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/06900

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	F.W. HOBBS JR.: "Palladium-catalyzed synthesis of alkynamino nucleosides. A universal linker for nucleic acids" J. ORG. CHEM., vol. 54, 1989, pages 3420-3422, XP002183069 table 1 ---	44, 47, 48
X	K.A. CRUICKSHANK, D.L. STOCKWELL: "Oligonucleotide labelling: a concise synthesis of a modified thymidine phosphoramidite" TETRAHEDRON LETTERS, vol. 29, 1988, pages 5221-5224, XP002183070 the whole document ---	44, 48, 61, 62
X	CLERCQ DE E ET AL: "NUCLEIC ACID RELATED COMPOUNDS. 40. SYNTHESIS AND BIOLOGICAL ACTIVITIES OF 5-ALKYNYLURACIL NUCLEOSIDES" JOURNAL OF MEDICINAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY. WASHINGTON, US, vol. 26, no. 5, 1983, pages 661-666, XP002069925 ISSN: 0022-2623 compound 11 ---	44, 48
X	ROBINS M J ET AL: "NUCLEIC ACID RELATED COMPOUNDS. 39. EFFICIENT CONVERSION OF 5-iodo to 5-alkynyl and derived 5-substituted uracil bases and nucleosides" JOURNAL OF ORGANIC CHEMISTRY, AMERICAN CHEMICAL SOCIETY. EASTON, US, vol. 48, no. 11, 1983, pages 1854-1862, XP002069924 ISSN: 0022-3263 scheme II -----	44, 48

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/06900

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9951775	A	14-10-1999	US 6127121 A AU 3472499 A EP 1068358 A1 WO 9951775 A1	03-10-2000 25-10-1999 17-01-2001 14-10-1999
WO 9849180	A	05-11-1998	US 6143877 A AU 7258698 A WO 9849180 A1	07-11-2000 24-11-1998 05-11-1998
WO 9951621	A	14-10-1999	US 6312894 B1 AU 3472199 A EP 1144429 A2 WO 9951621 A2	06-11-2001 25-10-1999 17-10-2001 14-10-1999
WO 9003370	A	05-04-1990	CA 1338379 A1 WO 9003370 A1 US 5824796 A US 5849482 A	11-06-1996 05-04-1990 20-10-1998 15-12-1998
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US 5849482	A	15-12-1998	US 5824796 A AU 709924 B2 AU 6103596 A CA 2223584 A1 EP 0842186 A1 JP 11509528 T WO 9640711 A1 US 5935830 A US 6136601 A AU 6296294 A WO 9417092 A1 US 6312953 B1 EP 0472648 A1 JP 4507402 T WO 9014353 A1 CA 1338379 A1 WO 9003370 A1 EP 0661979 A1 JP 6509945 T WO 9303736 A1	20-10-1998 09-09-1999 30-12-1996 19-12-1996 20-05-1998 24-08-1999 19-12-1996 10-08-1999 24-10-2000 15-08-1994 04-08-1994 06-11-2001 04-03-1992 24-12-1992 29-11-1990 11-06-1996 05-04-1990 12-07-1995 10-11-1994 04-03-1993
WO 9746313	A	11-12-1997	AU 3568897 A WO 9746313 A1 US 6057100 A	05-01-1998 11-12-1997 02-05-2000